

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of:

KOJI UNO

Application No.: 10/711,560

Filed: September 24, 2004

For: APPARATUS FOR PROVIDING  
ELECTRICAL SIGNALS TO  
BICYCLE COMPONENTS

Examiner: Pedro J. Cuevas

Art Unit: 2834

APPEAL BRIEF

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Commissioner:

This is an appeal brief for the above-captioned matter.

**I. Real Party In Interest**

The assignee and real party in interest is Shimano, Inc., a Japanese corporation having a principal place of business in Osaka, Japan.

**II. Related Appeals And Interferences**

There are no prior or pending appeals, interferences or judicial proceedings known to the appellant, to appellant's legal representative, or to the assignee which may be related to, directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

**III. Status Of Claims**

Claims 1-44 are pending under final rejection and are under appeal.

#### **IV. Status Of Amendments**

No amendment was filed subsequent to final rejection.

#### **V. Summary Of Claimed Subject Matter**

The application discloses several embodiments of an apparatus for providing electrical signals to bicycle components. Cited reference numbers and text are examples only and are not intended to be limiting. Line numbers refer to the line numbers within each individually cited paragraph. The embodiment shown in Fig. 9 is cumulative and will not be discussed in detail.

As applied to independent claim 1, an apparatus for providing electrical signals to bicycle components comprises:

a housing ((32), Fig. 4, page 4, paragraph [0017], lines 5-7; (132), Fig. 6, paragraph [0025], lines 4-6; (232), Fig. 8, paragraph [0034], lines 4-6) adapted to be mounted to the bicycle;

a regulator ((42), Fig. 3, page 4, paragraph [0018], lines 1-2; (142), Fig. 5, page 7, paragraph [0027], lines 1-2; (242), Fig. 7, page 10, paragraph [0037], lines 1-2) supported by the housing (32, 132, 232) to receive signals from a power supply ((19, 41), Fig. 3, page 4, paragraph [0018], lines 8-9; (19, 141), Fig. 5, page 7, paragraph [0027], lines 8-9; (19, 241) Fig. 7, page 10, paragraph [0037], lines 8-9); and

an output ((34), Fig. 4, page 4, paragraph [0017], lines 5-7; (134), Fig. 6, page 6, paragraph [0025], lines 4-6; (234), Fig. 8, page 9, paragraph [0034], lines 4-6) disposed on the housing (32, 132, 232) to supply regulated signals provided by the regulator (42, 142, 242) to a plurality of electrical bicycle components ((50), Fig. 4, page 4, paragraph [0019], lines 1-2; (150), Fig. 6, page 6, paragraph [0025], lines 1-3; (250), Fig. 8, pages 9-10, paragraph [0035], lines 2-4) external to the housing (32, 132, 232);

wherein the output (34, 134, 234) includes:

a first external terminal (e.g., one of (34a-34d), Fig. 4, page 4, paragraph [0017], lines 8-11; one of (136a-136d), Fig. 6, page 7, paragraph [0026], lines 3-7; one of (238a, 238b, 239), Fig. 8, page 10, paragraph [0036], lines 1-7) to provide electrical signals to a first electrical bicycle component (e.g., one of (51-54), Fig. 4, page 4, paragraph [0019], lines 2-4;

one of (151-154), Fig. 6, page 6, paragraph [0025], lines 3-4; one of (251,253, 254), Fig. 8, page 9, paragraph [0034], lines 3-4); and

a separate second external terminal (e.g., another one of (34a-34d), Fig. 4, page 4, paragraph [0017], lines 8-11; another one of (136a-136d), Fig. 6, page 7, paragraph [0026], lines 3-7; another one of (238a,238b, 239), Fig. 8, page 10, paragraph [0036], lines 1-7) to provide separate electrical signals to a second electrical bicycle component (e.g., another one of (51-54), Fig. 4, page 4, paragraph [0019], lines 2-4; another one of (151-154), Fig. 6, page 6, paragraph [0025], lines 3-4; another one of (251, 253, 254), Fig. 8, page 9, paragraph [0034], lines 3-4).

As applied to independent claim 26, an apparatus for providing electrical signals to bicycle components comprises:

a housing ((32), Fig. 4, page 4, paragraph [0017], lines 5-7; (132), Fig. 6, paragraph [0025], lines 4-6; (232), Fig. 8, paragraph [0034], lines 4-6) adapted to be mounted to the bicycle;

a voltage regulator ((42), Fig. 3, page 4, paragraph [0018], lines 1-2; (142), Fig. 5, page 7, paragraph [0027], lines 1-2; (242), Fig. 7, page 10, paragraph [0037], lines 1-2) supported by the housing (32, 132, 232) to receive power from a power supply ((19, 41), Fig. 3, page 4, paragraph [0018], lines 8-9; (19, 141), Fig. 5, page 7, paragraph [0027], lines 8-9; (19, 241) Fig. 7, page 10, paragraph [0037], lines 8-9) and to provide first and second different voltages (pages 4-5, paragraph [0019], lines 11-14; pages 7-8, paragraph [0028], lines 10-13; pages 10-11, paragraph [0038], lines 9-12), each of which is adapted to power respective first and second electrical bicycle components (e.g., two of (51-54), Fig. 4, page 4, paragraph [0019], lines 2-4; two of (151-154), Fig. 6, page 6, paragraph [0025], lines 3-4; two of (251,253, 254), Fig. 8, page 9, paragraph [0034], lines 3-4); and

first and second external output terminals (e.g., two of (34a-34d), Fig. 4, page 4, paragraph [0017], lines 8-11; two of (136a-136d), Fig. 6, page 7, paragraph [0026], lines 3-7; two of (238a, 238b, 239), Fig. 8, page 10, paragraph [0036], lines 1-7) disposed on the housing to supply the respective first and second different voltages from the regulator (42, 142, 242) to the respective first and second electrical bicycle components (51-54, 151-154, 251, 253, 254) external to the housing (32, 132, 232).

As applied to independent claim 27, an apparatus for providing electrical signals to bicycle components comprises:

a housing ((232), Fig. 8, paragraph [0034], lines 4-6) adapted to be mounted to the bicycle;  
a regulator ((242), Fig. 7, page 10, paragraph [0037], lines 1-2) supported by the housing (232) to receive signals from a signal source ((19, 241) Fig. 7, page 10, paragraph [0037], lines 8-9);  
a plurality of mounting members ((236a-236c), Fig. 8, page 9-10, paragraph [0035], lines 2-7) disposed on the housing (232) to directly attach a corresponding plurality of electrical bicycle components ((251,253, 254), Fig. 8, page 9, paragraph [0034], lines 3-4) to the housing (232); and  
an external output terminal ((238, 238b, 239), Fig. 8, page 10, paragraph [0036], lines 1-7) disposed on the housing (232) in close proximity to each mounting member (236a-236c) to supply regulated signals provided by the regulator (242) to corresponding ones of the plurality of electrical bicycle components (251,253, 254) mounted to the plurality of mounting members (236a-236c).

As applied to independent claim 28, an apparatus for providing electrical signals to bicycle components comprises:

a housing ((132), Fig. 6, paragraph [0025], lines 4-6) adapted to be mounted to the bicycle;  
a regulator ((142), Fig. 5, page 7, paragraph [0027], lines 1-2) supported by the housing (132) to receive signals from a signal source ((19, 141), Fig. 5, page 7, paragraph [0027], lines 8-9);  
a mounting member ((132a), Fig. 6, page 6, paragraph [0025], lines 6-8) adapted to directly mount each one of a plurality of electrical bicycle components (151-154) to that mounting member (132a), each electrical bicycle component (151-154) having different signal requirements; and  
an external output terminal ((136a-136d), Fig. 6, page 7, paragraph [0026], lines 3-7) disposed on the housing to supply regulated signals provided by the regulator (142) to each of the plurality of electrical bicycle components (151-154) when individually mounted to the mounting member (page 8, paragraph [0030], lines 11-17).

## **VI. Grounds Of Rejection To Be Reviewed On Appeal**

Claims 1-8, 10, 13 and 19 stand rejected under 35 U.S.C. §102(b) as being anticipated by Kitamura (US 6,418,041 B1).

Claims 9, 11-12, 14-18 and 20-28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kitamura (US 6,418,041 B1) in view of Copeland (US 5,015,918).

Claims 29-44 stand rejected for reasons not stated.

## **VII. Arguments**

### **Rejection under 35 U.S.C. §102(b) over Kitamura**

#### **Claims 1 and 19.**

Claim 1 recites a housing (32, 132, 232) adapted to be mounted to the bicycle, and a regulator (42, 142, 242) supported by the housing (32, 132, 232) to receive signals from a power supply (19, 141). The final office action refers to Kitamura's control panel (20) as a housing and voltage regulator (43) as the recited regulator. However, voltage regulator (43) is part of power supply (27) which, as stated at column 4, lines 47-51 of Kitamura, is housed within control box (31) mounted to the middle of the bicycle as shown in Fig. 2. Thus, voltage regulator (43) is not supported by control panel (housing) (20) as required by claim 1. Furthermore, there is no output on control panel (housing) (20) that provides regulated signals from regulator (43) to other components external to control panel (20). Finally, claim 1 recites the output having a first external terminal that provides power to a first electrical bicycle component, and a separate second external terminal that provides separate power to a second electrical bicycle component. Kitamura neither discloses nor suggests any external terminal that functions as an output.

#### **Claim 2.**

Not only does Kitamura fail to disclose external output terminals, but Kitamura fails to disclose signals provided to shift controller (9) and lamp controller (10a) that have physically different power characteristics as required by claim 2. In fact, the same signal is provided to both components from regulator (43). A circuit ground does not power electrical components. That is a function of the source voltage. Also, it can not be said that the signals provided to Kitamura's shift controller (9) and lamp controller (10a) inherently have physically different power characteristics. A claim limitation is inherent in the prior art if it is *necessarily* present in the prior art, not merely

probably or possibly present. *Rosco v. Mirror Lite*, 304 F.3d 1373, 1380; 64 USPQ2d 1676 (Fed.Cir. 2002).

**Claims 3-5.**

Claim 3 recites an input ((33), Fig. 4, page 4, paragraph [0017], lines 5-7; (133), Fig. 6, page 6, paragraph [0025], lines 4-6; (233), Fig. 8, page 9, paragraph [0034], lines 4-6) disposed on the housing (32, 132, 232) to receive power from an external power supply ((19), Figs. 3, 5 and 7) and to supply the power from the external power supply (19) (via cord (66), Figs. 4, 6 and 8) to the regulator (42, 142, 242). Insofar as Kitamura's control panel (20) is interpreted to be a housing, then, as shown in Kitamura's Fig. 4, control panel (20) does not have any input to receive power from an external power supply and to supply the power from the external power supply to a regulator.

Claim 5 recites a power storage element ((41), Fig. 3, (141), Fig. 5, (241), Fig. 7) supported by the housing (32, 132, 232) for storing power from the alternating current generator (19). As seen in Kitamura Fig. 4, no power storage element is supported by control panel (housing) (20).

**Claim 6.**

Claim 6 recites that the plurality of electrical bicycle components comprise a radio ((52), Fig. 4; (152), Fig. 6), a cell phone charger ((54), Fig. 4, (154), Fig. 6; (254), Fig. 8) and a light ((53), Fig. 4; (153), Fig. 6; (253), Fig. 8). Kitamura's components do not include a radio or a cell phone charger.

**Claims 7, 8 and 13.**

Claim 7 recites that at least one of the first external terminal (one of 34a-34d, 136a-136d, 238a, 238b, 239, Figs. 4, 6 and 8) or the second external terminal (another one of 34a-34d, 136a-136d, 238a, 238b, 239) is structured to be detachably connected to its corresponding first or second electrical bicycle component, and claims 8 and 13 recite a mounting member ((132a), Fig. 6, page 6, paragraph [0025], lines 6-8; ((236a-236c), Fig. 8, page 9-10, paragraph [0035], lines 2-7) structured to detachably mount a first or second electrical bicycle component ((151-154), (251, 253, 254) to the

housing (132, 232). The definition of "detachable" is "designed to come apart." Nothing on Kitamura's control panel (housing) (20) is designed to detachably connect any other component.

**Claim 10.**

Claim 10 recites that a surface of the mounting member (132a, Fig. 6; 236a-236b, Fig. 8) comprises one of a convex portion or a concave portion structured to engage a corresponding one of a concave portion or a convex portion on at least one of the first or second electrical bicycle components ((151-154), Fig. 6; (251, 253, 254), Fig. 8) so that the at least one of the first or second electrical bicycle components (151-154, 251, 253, 254) cannot be detached in a direction substantially perpendicular to the surface of the mounting member from which the one of the convex portion or the concave portion extends. This is readily apparent from the shape of the mounting members shown in Figs. 6 and 8 which prevent the electrical components (151-154, 251, 253, 254) from detaching from housing (132, 232) in the upward direction. Kitamura neither discloses nor suggests such features.

**Rejection under 35 U.S.C. §103(a) over Kitamura in view of Copeland.**

**Claims 9, 11-12, 14-18 and 20-28.**

As an initial matter, the final office action states at page 6 that it would be obvious "to use the bicycle single-wire lighting system disclosed by Copeland on the bicycle power supply disclosed by Kitamura for the purpose of providing a warning device that has all active electrical parts on a single circuit board *without parts being mounted to the case*, sub-assemblies or loose wiring" (emphasis added). That objective is stated in the Copeland patent at column 10, lines 65-68. As such, Copeland expressly teaches away from the provision of one or more external terminals, recited in all of the independent claims, because such external terminals are used to mount active electrical parts to the case (housing).

Copeland also fails to suggest a regulator supported by a housing such as Kitamura's control panel (housing) (20) as required by independent claims 1 and 26-28 and incorporated into dependent

claims 9, 11-12, 14-18 and 20-25. Copeland discloses a voltage limiter (38) at the generator (14). There is no suggestion to move such a regulator to Kitamura's control panel (housing) (20).

Furthermore, Copeland discloses a cable (15) that detachably connects a headlamp unit (17) to a rear warning light (13). Copeland discloses nothing more than the fact that electrical signals may be communicated between two remotely located electrical components through a wire. As with Kitamura, Copeland fails to disclose: (1) a mounting member as recited in independent claim 28, dependent claim 8, and incorporated into claims 9, 11 and 12, or (2) a plurality of mounting members as recited in independent claim 27, dependent claim 13 and incorporated into claims 14-18. Because Copeland fails to disclose or suggest a mounting member Copeland also fails to disclose the close proximal relation of the external terminals to a mounting member as recited in claims 14, 15 and 27, or a mounting member configured such that the at least one of the first or second electrical bicycle components (151-154, 251, 253, 254) cannot be detached in a direction substantially perpendicular to the surface of the mounting member as recited in claim 17.

Claims 12 and 18 recites the first external terminal and the second external terminal providing different physical power characteristics relative to each other, and claim 26 recites the voltage regulator providing different voltages to power different electrical bicycle components. As with Kitamura, Copeland's cable (15) carries the same signal to both headlamp (17) and rear warning light (13), so only one signal is provided to power the components. A circuit ground does not power electrical components. That is a function of the source voltage. Thus, Copeland neither discloses nor suggests the subject matter recited in claims 12, 18 and 26.

**Claim 20.**

Claim 20 recites that the first external terminal (e.g., (34a), Fig. 3, page 5, paragraph [0020], lines 1-3; (136a), Fig. 5, page 8, paragraph [0029], lines 1-3; (238a), Fig. 7, page 11, paragraph [0039], lines 1-3) is structured to communicate a data signal to a display. (The pulsed data signals are used to calculate speed and travel distance, for example, as stated at page 5, paragraph [0021], lines 6-9; pages 8-9, paragraph [0031], lines 3-6; page 12, paragraph [0042], lines 3-6.)



The final office action states that Copeland discloses a data signal output (44, 45) disposed on a housing and structured to communicate a data signal to display (24). There is no display (24) in Copeland. Furthermore, claim 20 recites a first external terminal, not a generic "output." Copeland's element (45) is a transformer, not an external terminal. Finally, Copeland's terminal (44) only receive operating power from battery (3) or generator (14). No data is communicated across that terminal.

**Claim 22.**

Claim 22 recites a waveform shaping circuit ((42b), Fig. 3, page 5, paragraph [0020], lines 1-3; (142b), Fig. 5, page 8, paragraph [0029], lines 1-3; (242b), Fig. 7, page 11, paragraph [0039], lines 1-3) that receives a signal from a signal input and provides a shaped signal as the data signal to the first external terminal ((34a), Fig. 3; (136a), Fig. 5; (238a), Fig. 7).

The final office action states that Copeland discloses a waveform shaping circuit (Figs. 6-13) that receives a signal from a signal input (40, 41) and provides a shaped signal as a data signal to data signal output (44, 45). As noted above, Copeland's element (45) is a transformer, not an external terminal. Furthermore, Fig. 6 discloses the detailed construction of a voltage regulator (6) that supplies operating voltage to headlamp (1). Voltage regulator (6) does not communicate signals to terminal (44). Fig. 7 discloses the detailed construction of an automatic cutoff circuit (7) that switches off voltage regulator (6) when battery (3) is excessively discharged. As noted, voltage regulator (6) does not communicate signals to terminal (44). Fig. 8 discloses the detailed construction of an overvoltage protection circuit (8) that prevents battery (3) from being overcharged. Overvoltage protection circuit (8) does not communicate signals to terminal (44). Fig. 9 discloses the details of construction of a fuse circuit (9) that cuts off current in the event of a short circuit between terminals (23) and (24). Fuse circuit (9) does not communicate signals to terminal (44). Fig. 10 discloses the details of construction of an alternative rectifier arrangement for generator (14). Generator (14) provides only operating power, not data signals. Fig. 11 discloses details of construction of an oscillator (11) used to control the flashing of rear lamp (5). Oscillator (11) does not provide signals to terminal (44). Fig. 12 discloses details of construction of a flashtube trigger circuit (12) that also is used to control the operation of lamp (5). Flashtube trigger circuit (12) does

not provide signals to terminal (44). Fig. 13 is a complete schematic diagram of the rear warning lights (13). Nothing therein provides data signals to either terminal (43) or terminal (44).

**Claim 28.**

In addition to the above comments directed to this claim, Kitamura and Copeland also fail to disclose or suggest a mounting member ((132a), Fig. 6, page 6, paragraph [0025], lines 6-8) adapted to directly mount each one of a plurality of electrical bicycle components (151-154) to that mounting member (132a), each electrical bicycle component (154) having different signal requirements, and an external output terminal (136a-136d) disposed on the housing (132) to supply regulated signals provided by the regulator (142) to each of the plurality of electrical bicycle components (151-154) when individually mounted to the mounting member (132a).

**The summary rejection of claims 29-44**

**Claim 29.**

Neither Kitamura nor Copeland discloses or suggests each first and second external terminal (pairs of 34a-34d, 136a-136d, 238a, 238b, 239, Figs. 4, 6 and 8) providing a detachable connection to its respective first and second electrical bicycle component, especially since Copeland expressly seeks to avoid attaching active electrical devices to the housing.

**Claim 30.**

Neither Kitamura nor Copeland discloses or suggests a waveform shaping circuit ((42b), Fig. 3, page 5, paragraph [0020], lines 1-3; (142b), Fig. 5, page 8, paragraph [0029], lines 1-3; (242b), Fig. 7, page 11, paragraph [0039], lines 1-3) structured to convert an electrical signal from an alternating current generator (19) into a pulsed signal.

**Claim 31.**

Neither Kitamura nor Copeland discloses or suggests an auto-light circuit ((43), Fig. 3, page 4, paragraph [0018], lines 1-2; (143), Fig. 5, page 7, paragraph [0027], lines 1-2; (243), Fig. 7, page 10, paragraph [0037], lines 1-2) supported by the housing ((32, 132, 232), Figs. 4, 6, 8) to provide

signals through the first external terminal ((34c, 136c, 239a), Figs. 4, 6, 8) to automatically turn a light on and off (pages 4-5, paragraph [0019], lines 8-11; pages 7-8, paragraph [0028], lines 7-10; pages 10-11, paragraph [0038], lines 6-9). Kitamura's lamp control circuit (18a) is mounted to the front fork (18a) and is not supported by control panel (housing) (20).

**Claim 32.**

Neither Kitamura nor Copeland discloses or suggests disposing a regulator ((42, 142, 242), Figs. 3, 5, 7) within Kitamura's control panel (housing) 20.

**Claim 34.**

Neither Kitamura nor Copeland discloses or suggests electrical signals provided by a first external terminal (one of 34a-34d, 136a-136d, 238a, 238b, 239, Figs. 4, 6 and 8) and a second external terminal (another one of 34a-34d, 136a-136d, 238a, 238b, 239, Figs. 4, 6 and 8) having a voltage in a range of from approximately 1.2 volts to approximately 3.7 volts (pages 4-5, paragraph [0019], lines 11-14; pages 7-8, paragraph [0028], lines 10-13; pages 10-11, paragraph [0038], lines 9-12).

**Claim 35.**

Neither Kitamura nor Copeland discloses or suggests a third external terminal (a third one of 136a-136d, Fig. 6) to provide separate electrical signals to a third electrical bicycle component (a third one of 151-154), wherein the first, second and third external terminals are disposed in a row (Fig. 6).

**Claim 36.**

Claim 36 depends from claim 8, and it recites similar subject matter as claim 10. Claim 36 is patentable for the same reasons noted for claim 10.

**Claims 37-40.**

As noted for claim 8, neither Kitamura nor Copeland discloses or suggests a mounting member, let alone a mounting member that includes an abutment that faces in a direction toward the housing as recited in claim 37 or a mounting member that has a dovetail shape as recited in claim 38 ((132a), Fig. 6; ((236a-236b), Fig. 8), let alone the positioning of the external terminals at the side of mounting members as recited in claims 39 and 40.

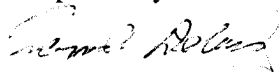
**Claim 41.**

Claim 41 depends from claim 13, and it recites similar subject matter as claim 17. Claim 41 is patentable for the same reasons noted for claim 17.

**Claims 42-44.**

As noted for claim 13, neither Kitamura nor Copeland discloses or suggests a plurality of mounting members, let alone a mounting member that includes an abutment that faces in a direction toward the housing as recited in claim 42 or a mounting member that has a dovetail shape as recited in claim 43 ((236a-236b), Fig. 8), let alone the positioning of the external terminals at the side of mounting members as recited in claim 44.

Respectfully submitted,



James A. Deland  
Reg. No. 31,242

DELAND LAW OFFICE  
P.O. Box 69  
Klamath River, California 96050  
530-465-2430

**VIII. CLAIMS APPENDIX**

CLAIM 1. An apparatus for providing electrical signals to bicycle components, wherein the apparatus comprises:

- a housing adapted to be mounted to the bicycle;
  - a regulator supported by the housing to receive signals from a power supply; and
  - an output disposed on the housing to supply regulated signals provided by the regulator to a plurality of electrical bicycle components external to the housing;
- wherein the output includes:
- a first external terminal to provide electrical signals to a first electrical bicycle component; and
  - a separate second external terminal to provide separate electrical signals to a second electrical bicycle component.

CLAIM 2. The apparatus according to claim 1 wherein the output comprises a plurality of power communication paths, wherein a first power communication path connected to the first external terminal provides a physically different power characteristic than a second power communication path connected to the second external terminal.

CLAIM 3. The apparatus according to claim 1 further comprising an input disposed on the housing to receive power from an external power supply and to supply the power from the external power supply to the regulator.

CLAIM 4. The apparatus according to claim 3 wherein the input is adapted to receive power from an alternating current generator.

CLAIM 5. The apparatus according to claim 4 further comprising a power storage element supported by the housing for storing power from the alternating current generator.

CLAIM 6. The apparatus according to claim 4 wherein the plurality of electrical bicycle components comprise a radio, a cell phone charger and a light.

CLAIM 7. The apparatus according to claim 1 wherein at least one of the first external terminal or the second external terminal is structured to be detachably connected to its corresponding first or second electrical bicycle component.

CLAIM 8. The apparatus according to claim 7 further comprising a mounting member disposed on the housing to detachably mount at least one of the first or second electrical bicycle components to the housing.

CLAIM 9. The apparatus according to claim 8 wherein the at least one of the first external terminal or the second external terminal comprises a contact terminal structured to contact a complementary contact terminal on its corresponding first or second electrical bicycle component when the corresponding first or second electrical bicycle component is mounted to the housing.

CLAIM 10. The apparatus according to claim 8 wherein a surface of the mounting member comprises one of a convex portion or a concave portion structured to engage a corresponding one of a concave portion or a convex portion on at least one of the first or second electrical bicycle components so that the at least one of the first or second electrical bicycle components cannot be detached in a direction substantially perpendicular to the surface of the mounting member from which the one of the convex portion or the concave portion extends.

CLAIM 11. The apparatus according to claim 8 wherein each of the first external terminal and the second external terminal is structured to be detachably connected to its corresponding first or second electrical bicycle component.

CLAIM 12. The apparatus according to claim 11 wherein the first external terminal and the second external terminal provide different physical power characteristics relative to each other.

CLAIM 13. The apparatus according to claim 7 further comprising first and second mounting members disposed on the housing, each mounting member being structured to detachably mount a corresponding one of the first or second electrical bicycle components to the housing.

CLAIM 14. The apparatus according to claim 13 wherein the first and second external terminals comprise respective first and second contact terminals, wherein the first contact terminal is

provided in close proximity to the first mounting member and is structured to contact a first complementary contact terminal on the first electrical bicycle component when the first electrical bicycle component is mounted to the first mounting member, and wherein the second contact terminal is provided in close proximity to the second mounting member and is structured to contact a second complementary contact terminal on the second electrical bicycle component when the second electrical bicycle component is mounted to the second mounting member.

CLAIM 15. The apparatus according to claim 13 wherein the first and second external terminals comprise respective first and second connector terminals, wherein the first connector terminal is provided in close proximity to the first mounting member and is structured to engage a first complementary connector terminal on the first electrical bicycle component when the first bicycle component is mounted to the first mounting member, and wherein the second connector terminal is provided in close proximity to the second mounting member and is structured to engage a second complementary connector terminal on the second electrical bicycle component when the second electrical bicycle component is mounted to the second mounting member.

CLAIM 16. The apparatus according to claim 15 wherein the first connector terminal comprises one of a male or a female connector terminal, and wherein the first complementary connector terminal comprises the other one of the male or the female connector terminal.

CLAIM 17. The apparatus according to claim 13 wherein each of the plurality of mounting members comprises one of a convex portion or a concave portion structured to engage a corresponding one of a concave portion or a convex portion on at least one of the first or second electrical bicycle components so that the at least one of the first or second electrical bicycle components cannot be detached in a direction substantially perpendicular to the surface of the mounting member from which the one of the convex portion or the concave portion extends.

CLAIM 18. The apparatus according to claim 13 wherein the first external terminal and the second external terminal provide different physical power characteristics relative to each other.

CLAIM 19. The apparatus according to claim 1 wherein signals communicated from the regulator to the first external terminal are adapted to be communicated to a display.

CLAIM 20. The apparatus according to claim 19 wherein the first external terminal is structured to communicate a data signal to the display.

CLAIM 21. The apparatus according to claim 20 further comprising a signal input disposed on the housing and structured to receive a signal from outside of the housing.

CLAIM 22. The apparatus according to claim 21 further comprising a waveform shaping circuit supported by the housing, wherein the waveform shaping circuit receives the signal from the signal input and provides a shaped signal as the data signal to the first external terminal.

CLAIM 23 (ORIGINAL): The apparatus according to claim 22 wherein the signal input is structured to receive a signal from an alternating current generator.

CLAIM 24. The apparatus according to claim 23 wherein the regulator receives the signal from the alternating current generator and uses the signal from the alternating current generator to provide power to the first external terminal to power the display.

CLAIM 25. The apparatus according to claim 24 further comprising a power storage element supported by the housing for storing power from the alternating current generator.

CLAIM 26. An apparatus for providing electrical signals to bicycle components, wherein the apparatus comprises:

- a housing adapted to be mounted to the bicycle;

- a voltage regulator supported by the housing to receive power from a power supply and to provide first and second different voltages, each of which is adapted to power respective first and second electrical bicycle components; and

- first and second external output terminals disposed on the housing to supply the respective first and second different voltages from the regulator to the respective first and second electrical bicycle components external to the housing.

CLAIM 27. An apparatus for providing electrical signals to bicycle components, wherein the apparatus comprises:

- a housing adapted to be mounted to the bicycle;



a regulator supported by the housing to receive signals from a signal source;  
a plurality of mounting members disposed on the housing to directly attach a corresponding plurality of electrical bicycle components to the housing; and  
an external output terminal disposed on the housing in close proximity to each mounting member to supply regulated signals provided by the regulator to corresponding ones of the plurality of electrical bicycle components mounted to the plurality of mounting members.

CLAIM 28. An apparatus for providing electrical signals to bicycle components, wherein the apparatus comprises:

a housing adapted to be mounted to the bicycle;  
a regulator supported by the housing to receive signals from a signal source;  
a mounting member adapted to directly mount each one of a plurality of electrical bicycle components to that mounting member, each electrical bicycle component having different signal requirements; and  
an external output terminal disposed on the housing to supply regulated signals provided by the regulator to each of the plurality of electrical bicycle components when individually mounted to the mounting member.

CLAIM 29. The apparatus according to claim 1 wherein each first and second external terminal provides a detachable connection to its respective first and second electrical bicycle component.

CLAIM 30. The apparatus according to claim 1 wherein the regulator includes a waveform shaping circuit structured to convert an electrical signal from an alternating current generator into a pulsed signal.

CLAIM 31. The apparatus according to claim 1 further comprising an auto-light circuit supported by the housing to provide signals through the first external terminal to automatically turn a light on and off.

CLAIM 32. The apparatus according to claim 1 wherein the regulator is disposed within the housing.

CLAIM 33. The apparatus according to claim 1 wherein the electrical signals provided by the first external terminal are different from the electrical signals provided by the second external terminal.

CLAIM 34. The apparatus according to claim 1 wherein the electrical signals provided by the first external terminal and the second external terminal have a voltage in a range of from approximately 1.2 volts to approximately 3.7 volts.

CLAIM 35. The apparatus according to claim 1 wherein the output includes a third external terminal to provide separate electrical signals to a third electrical bicycle component, wherein the first, second and third external terminals are disposed in a row.

CLAIM 36. The apparatus according to claim 8 wherein the mounting member projects from a surface of the housing and is structured to detachably connect at least one of the first or second electrical bicycle components such that the at least one of the first or second electrical bicycle components cannot be detached in a direction substantially perpendicular to the surface of the housing.

CLAIM 37. The apparatus according to claim 36 wherein the mounting member has a wall that forms an abutment that faces in a direction toward the surface of the housing.

CLAIM 38. The apparatus according to claim 37 wherein the mounting member has a dovetail shape.

CLAIM 39: The apparatus according to claim 36 wherein the first external terminal is disposed on the housing at a first side of the mounting member, and wherein the second external terminal is disposed on the housing at an opposite second side of the mounting member.

CLAIM 40: The apparatus according to claim 39 wherein the first external terminal is disposed on the housing at a first side of the mounting member, and wherein the second external electrical terminal is disposed on the housing at the first side of the mounting member.

CLAIM 41. The apparatus according to claim 13 wherein each of the first mounting member and the second mounting member projects from a surface of the housing and is structured to detachably connect at least one of first or second electrical bicycle components such that the at least one of the first or second electrical bicycle components cannot be detached in a direction substantially perpendicular to the surface of the housing.

CLAIM 42. The apparatus according to claim 41 wherein each of the first mounting member and the second mounting member has a wall that forms an abutment that faces in a direction toward the surface of the housing.

CLAIM 43. The apparatus according to claim 42 wherein at least one of the first mounting member and the second mounting member has a dovetail shape.

CLAIM 44. The apparatus according to claim 41 wherein the first external terminal is disposed on the housing at a first side of the first mounting member, wherein the second external terminal is disposed on the housing at a first side of the second mounting member, and wherein the output further includes:

a third external terminal disposed on an opposite second side of the first mounting member to provide electrical signals to the first electrical bicycle component; and

a fourth external terminal disposed on an opposite second side of the second mounting member to provide electrical signals to the second electrical bicycle component.

**IX. EVIDENCE APPENDIX**

**None**

**X. RELATED PROCEEDINGS APPENDIX**

None